

# THE TOSHIBA E3736 MULTI BEAM KLYSTRON

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The LC cold option

A 10-MW, L-band multi beam klystron (MBK) for TESLA linear collider and TESLA XFEL has been under development at Toshiba Electron Tubes & Devices Co., Ltd. (TETD) in collaboration with KEK. The TESLA requires pulsed klystrons capable of 10 MW output power at 1300 MHz with 1.5 ms pulse length and a repetition rate of 10 pps. The MBK with 6 low-perveance beams in parallel in the klystron enables us to operate at lower cathode voltage with higher efficiency. The design work has been accomplished and the fabrication is under way. We are going to start conditioning and testing of prototype #0 in the mid of April. The design parameters for the E3736 klystron are shown in Table 1.

Table 1. Design Parameters of the E3736

Operating Frequency	1300 MHz
Peak Output Power	10 MW
Average Output Power	150 kW
Beam Voltage	115 kV
Beam Current	132 A
Efficiency	>65 %
RF Pulse Duration	1.5-2.0 ms
Repetition Rate	10 pps
Saturation Gain	47 dB
Number of Beams	6
Number of Cavities	6
Cathode Loading	<2.1 A/cm <sup>2</sup>
Solenoid Power	<4 kW

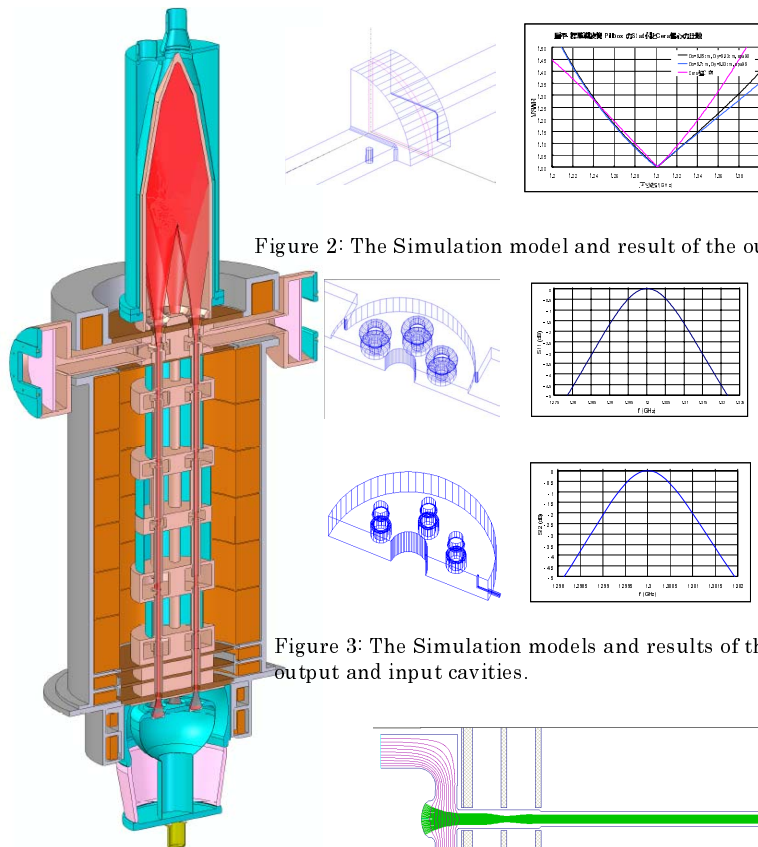


Figure 2: The Simulation model and result of the output window.

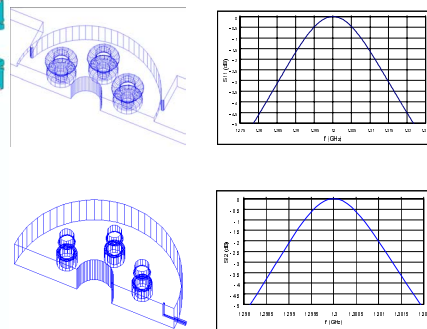


Figure 3: The Simulation models and results of the output and input cavities.

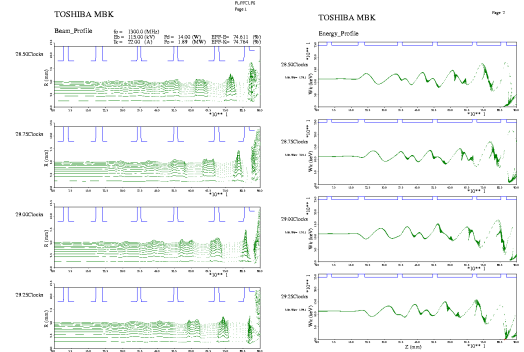


Figure 4: FCI Simulation Result.

Figure 1: TOSHIBA E3736 KLYSTRON

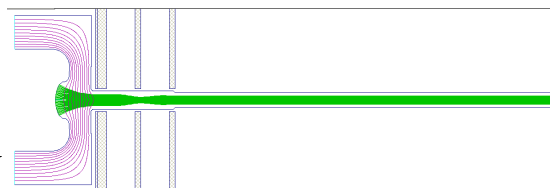


Figure 6: Gun design of E3736

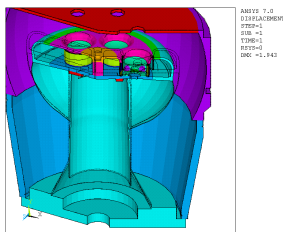


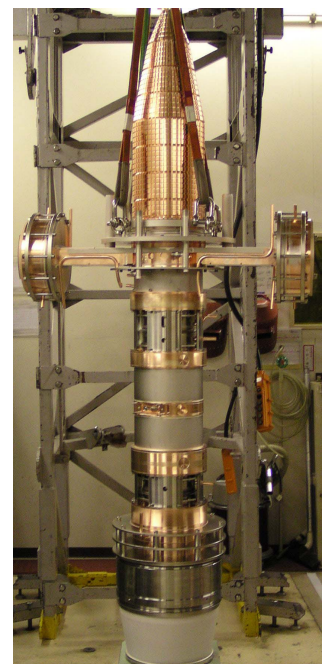
Figure 5: The Simulation model and result of the electron Gun using ANSYS code.



Figure 7: The cathode assembly in the vacuum bell jar



Figure 8: The electron gun



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